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# Surficial Geology of the Merrimack River Valley Between Manchester and Nashua, New Hampshire

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# TRIP B-4

# SURFICIAL GEOLOGY OF THE MERRIMACK RIVER VALLEY BETWEEN MANCHESTER AND NASHUA, NEW HAMPSHIRE

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This trip will examine evidence for two tills thought to represent separate glaciations, and evidence for a minor readvance during the last glaciation. Other stops include exposures related to glacial Lake Merrimack, postlake erosion, and late glacial eolian activity.

REFERENCES CITED:

Goldthwait, J. W., Goldthwait, Lawrence, and Goldthwait, R. P., 1951, The geology of New Hampshire, Part I, Surficial geology: Concord, N. H., New Hampshire State Plan. and Devel. Comm., 83 p.

Koteff, Carl, 1970, Surficial geologic map of the Milford quadrangle, Hillsborough Country, New Hampshire: U.S. Geol. Survey, Geol. Quad. Map GQ-881.

MAPS

Topographic maps covering the area are the Goffstown, Manchester North, Manchester South, Nashua North, and Pinnardville 7 1/2 minute quadrangles, 1968 editions, 1:24,000 scale or the Milford and Manchester 15-minute quadrangles, 1953 editions, 1:62,500 scale.

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_/ Publication authorized by the Director, U.S. Geological Survey.

ROAD LOG FOR TRIP B-4

Mileage

0.0 Intersection of Interstate 93 with U.S. Routes 4 and 202 and State Route 9. Take Interstate 93 south. Road crosses the flood plain of the Merrimack River.

2.7 Junction with Interstate 89, continue south on Interstate 93. Above the flood plain the road traverses till, bedrock, and ice-contact sand and gravel deposits; the last were probably laid down in a glacial lake.

7.9 Delta on left with topset-foreset contact at 311 feet altitude. It does not fit the projected glacial Lake Merrimack profile farther south and perhaps represents a very local lake.

9.6 Hookset toll station.

15.7 Exit to Amoskeag Bridge-Goffstown; circle over Interstate 93.

16.1 Bear left at intersection and cross over Interstate 93.

16.3 Turn right on Front Street.

16.5 Lacustrine sediments exposed on the left.

16.7 Turn left on Dunbarton Road. Road ascends the Black Brook delta.

17.4 Entrance to Manchester dump on right.

STOP 1 Excellent exposures of collapse structures in Black Brook delta. The altitude of the topset-foreset contact here is 272 feet, more than 10 feet higher than the projected level of glacial Lake Merrimack.

17.4 Retrace route from dump entrance to Front Street.

18.0 Turn right on Front Street.

18.4 Turn right at intersection on Goffstown Road.

19.8 Bear left on Goffstown Road.

20.0 Goffstown town line.

22.3 Bear left on Center Street.

22.5 Turn left at intersection in the center of Grassmere. Descend steep grade to flood plain of the Piscataquog River.

22.8 Cross Piscataquog River.

23.3 Intersection with State Route 114; turn left. Road follows the southern boundary of the Piscataquog River delta which was built into glacial Lake Merrimack to the east.

24.3 Intersection with State Route 114A; turn right on State Route 114.

25.4 Intersection with Shirley Hill Road. Turn right at traffic light.

26.2 Intersection with Walnut Hill Road; continue straight ahead.

26.3 STOP 2 Exposure of lower brown till overlain by upper gray till. Color (thought to be the result of subaerial oxidation) and textural differences between the two tills and structural relationships in the contact zone are the basis for distinguishing these tills as products of separate glaciations.

Return to intersection of State Route 114.

27.1 Turn right on State Route 114. For the most part road is on top of Bowman Brook delta, which was deposited into glacial Lake Merrimack.

29.7 Intersection with State Route 101. Continue straight on Route 101 from traffic light. Road descends onto post-Lake Merrimack stream terraces.

30.7 Junction of U.S. Route 3 to Bedford.

30.9 Stop sign; turn left.

31.0 Stop sign; turn right (south) on Route 3. Road crosses several postlake stream terraces.

31.8 Cross over Everett Turnpike.

34.9 Powerline. View to the left (east) of postlake stream terraces and modern flood plain. Deposits under the powerline on the skyline across the valley are ice-contact sand and gravel deposited in glacial Lake Merrimack.

37.4 Turn left on Twin Bridge Road. Road descends over several terrace levels.

37.6 Entrance to Merrimack dump.

STOP 3 Exposure of postglacial stream-terrace deposits over collapsed lacustrine sediments of glacial Lake Merrimack. Exposure to the south is in an exhumed esker. Merrimack River and modern flood plain are to the east.

Return along Twin Bridge Road to U.S. Route 3.

37.8 Turn right on U.S. Route 3.

44.1 Intersection with State Route 101 east. Turn right.

44.3 Bear left; follow Route 101 east.

44.9 Merrimack River.

45.2 Turn off at Exit 2, Brown Avenue.

45.3 Stop sign; turn right on State Route 3A. Road traverses flood plain, exposures of Lake Merrimack sediments on the left.

46.6 Cross Cohas Brook. Road continues along Merrimack River flood plain.

49.3 Intersection with Corning Road on left. Continue straight ahead. Road ascends onto an early postlake stream terrace.

51.9 Intersection with Hillcrest Road; turn left.

52.5 STOP 4 Wind-polished bedrock locality. Outcrop is part of a silicified zone thought to represent a major fault trending northeast. Wind-cut grooves on rock show wind direction from the northwest.

Return to State Route 3A.

53.1 Turn right on State Route 3A.

54.6 STOP 4A Lake Merrimack delta exposure showing at least two incised postlake stream terraces on right. This will be an optional stop if time permits and if the exposure is in good condition.

57.5 Intersection with side road; turn right into pit.

STOP 5 Exposure in Lake Merrimack delta showing complex slump structures. Several episodes of slumping and compaction are represented.

58.2 Rejoin State Route 3A; turn right.

58.6 Intersection with Newburry Road. Turn right to Manchester Municipal Airport. Road ascends delta.

58.7 Turn right at top of hill. Road goes around south end of runway.

59.0 Bear right on Perimeter Road. Enter Grenier Field, U.S. Air Force property.

59.5 Bear left; continue on Perimeter Road.

59.9 STOP 6 Exposure on north side of road is interpreted as showing a minor ice readvance in Lake Merrimack.

60.5 Bear left (north) around runway.

60.9 Turn right through gate; cross railroad tracks.

Continue on Durgue Road.

61.3 Stop sign. Turn left on Harvey Road.

61.6 Intersection with Sheffield Road; turn right.

61.9 Stop sign. Intersection with South Willow Street (State Route 28); turn right.

62.3 STOP 7 Exposure up the hill to the right shows two tills similar to Stop 2. Complex structures occur at the contact of the two tills.

END OF TRIP. Return to Concord, north on Route 28 to Interstates 193 and 93.